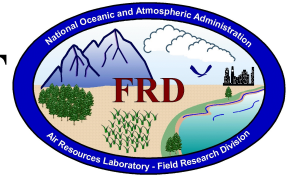




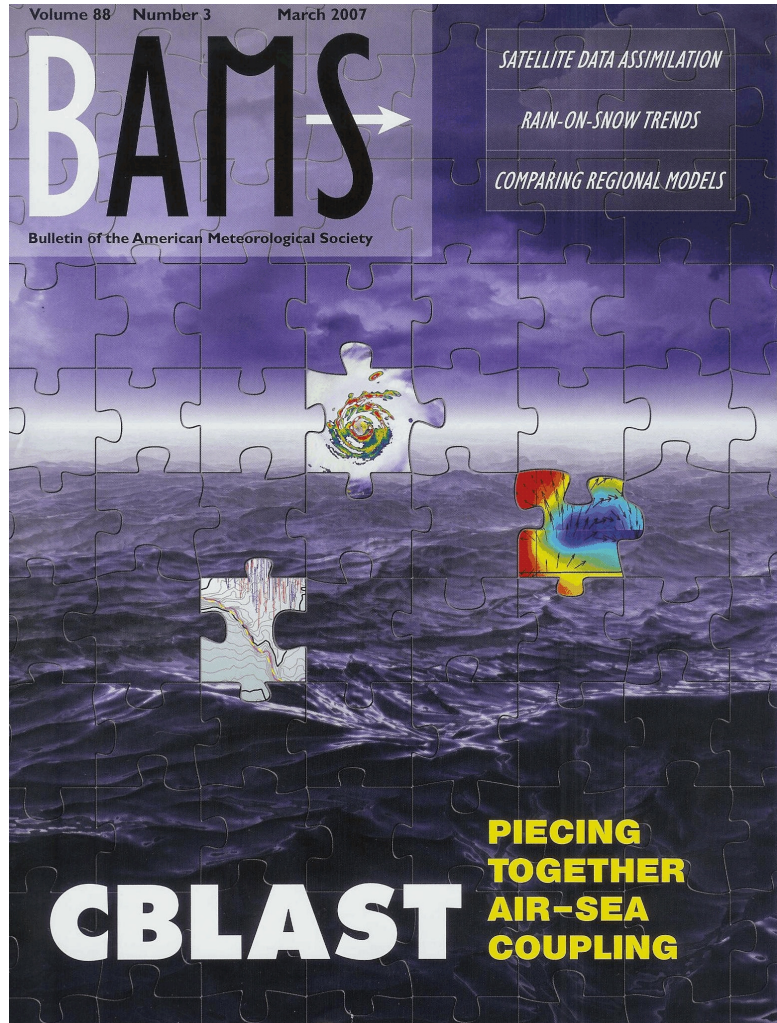
# FRD ACTIVITIES REPORT

## April 2007



### Research Programs

For the 3<sup>rd</sup> time in only 5 months, scientists from FRD have co-authored scientific research articles that have been featured on the cover of the Bulletin of the American Meteorological Society (BAMS). The new April issue discusses the progress being made in the Coupled Boundary Layer Air-Sea Transfer (CBLAST) program. One article in this latest issue described how observations are being combined with numerical models to better understand the transfer of heat, mass, and momentum between the ocean and the atmosphere. A second article in the same issue discussed the use of the ARL Best Aircraft Turbulence (BAT) probe used on the NOAA P-3 in hurricane penetrations that have resulted in a better understanding of drag coefficients and other air-sea exchange properties in hurricanes. The two earlier BAMS featuring FRD research on the covers were the November 2006 and the February 2007 issues. The NOAA “Smart Balloon” and the Pentagon Shield experiments were described in detail in accompanying articles. (Kirk Clawson, 208-526-2742)



The cover of the April 2007 issue of the Bulletin of the American Meteorological Society featuring the CBLAST program in which FRD is a research partner.

### Urban Dispersion Program

The Urban Dispersion Program continues to make headway. A teleconference presentation with accompanying PowerPoint slides was presented on 20 April to several NYC officials from city departments including the Office of Emergency Management, NYPD, FDNY, Transit Authority,

and Health and Mental Hygiene. Other participants represented federal agencies such as the FBI, DHS, and two DOE national laboratories. The presentation was given by Dr. Jerry Allwine of the Pacific Northwest National Laboratory, who serves as the Principal Investigator of the program. Our atmospheric tracer work in Midtown Manhattan and subsequent related data analyses were a major component of the presentation. The presentation provided new urban dispersion results and recommendations for future research. (Kirk Clawson, 208-526-2742, and Dennis Finn)

In response to reviewer comments and reconsideration of the approach used to develop the topics in the manuscript, the existing Joint Urban 2003 paper describing atmospheric tracer results from Oklahoma City, was significantly revised. The revisions have been completed in draft form and the paper is now titled “Atmospheric flow decoupling and its effects on urban plume dispersion”. (Dennis Finn, 208-526-0566)

### ***ET Probe***

Page proofs for the *Journal of Atmospheric and Oceanic Technology* paper on the ET probe were received in early April. Only a few minor edits were required to the proofs, and the edited proofs were quickly sent back to the American Meteorological Society for further processing. (Richard Eckman, 526-2740)

### ***Perfluorocarbon Tracer Analysis Development***

The long-term perfluorocarbon (PFC) sample stability (aging) tests for low (250 pptv), middle (4,000 pptv), and high (100,000 pptv) concentrations are still in progress. Each set of cartridges has been analyzed over periods of several weeks and indications are that the concentrations in the sample bags are maintaining their original concentrations. These will continue to be analyzed intermittently over the next several months to complete this particular study. Some followup tests are still required to complete the evaluation of some of the artifacts identified last month, in particular, the artifacts associated with very high concentrations. (Dennis Finn, 208-526-0566, and Roger Carter)

### ***UrbaNet***

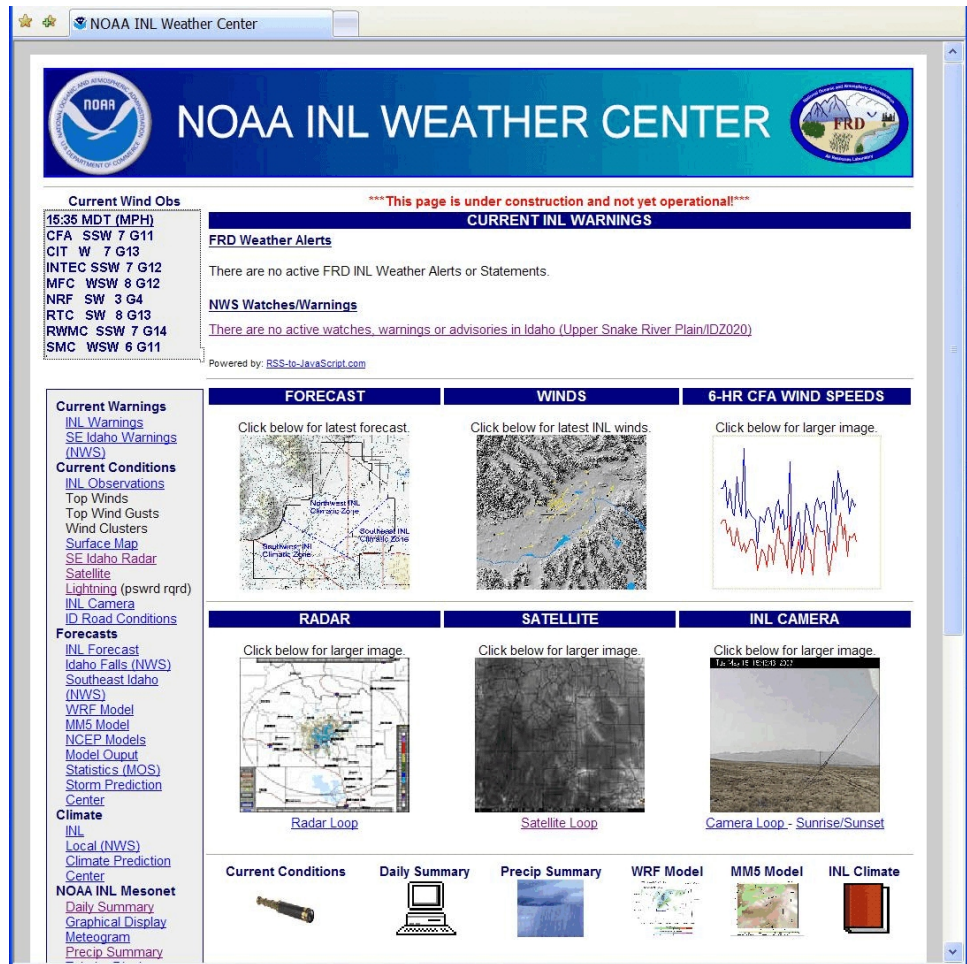
The UrbaNet Program at FRD remains on hold while we wait for OAR and ARL to decide funding levels for this year. We are ready and willing to continue the development of Urban Model Output Statistics (UMOS) using dense urban mesonets and also in conducting a tracer of opportunity study in Washington, DC.

## **Cooperative Research with DOE NE-ID (Idaho National Laboratory)**

### ***NOAA INL Weather Center Web Page***

Work has begun on a new one-stop weather web page for the INL. The page is called the NOAA INL Weather Center and includes current data and summaries previously available only on

multiple web pages. It has been designed to simultaneously provide meteorological information to both emergency and daily operations managers. The highlight of the new weather page is the presentation of severe weather hazard information generated by the local FRD weather forecaster as well as that from the National Weather Service in Pocatello. Other weather information available at the single click of a mouse button includes the INL weather forecast, wind speed trends, radar loop and satellite loop. While the web page will be a work in progress for a few months, we are planning to make the web page live sometime in late May or early June in time for the severe and fire weather seasons. (Brad Reese, 208-526-5707, Jason Rich, Neil Hukari, and Roger Carter)



Prototype NOAA INL Weather Center web page.

### ***Radar Wind Profiler Repair***

We have been continuing our efforts to resurrect the spare INL wind profiler. This is a 924 MHz boundary layer wind profiler that was originally part of a SERDP system. It has been in storage for a number of years and it has been a nontrivial task to locate and assemble the pieces. NOAA ESRL was kind enough to provide some advice and some updated software for the system. Vaisala was able to provide us with a maintenance manual. The system is now operating and we have completed all the diagnostic procedures that we can with the equipment we have. There are some problems with the data and some indications that the final amplifier may not be operating correctly. Hopefully, these can be corrected so that the system will be available for use. (Roger Carter, 208-526-2745, Tom Strong, and Shane Beard)

### ***Emergency Operations Center (EOC)***

An EOC quarterly assessment meeting was held at the EOC in early April. The drill was attended by the BEA assessment specialists, several people from the Idaho Department of Environmental Quality, and a NOAA FRD meteorologist. A table-top exercise was conducted in which we talked through an INL site emergency scenario. The main focus of the meeting was to compare the NOAA MDIFF model and the DOE RSAC model against the field sampler data so the planning support director could make better recommendations on future evacuation support. (Jason Rich, 208-526-9513)

On 10 April, Team B attended their second EOC requalification drill of 2007. The drill was centered on several drums containing radioactive material that fell off a truck at the RWMC facility. Team B operated the MDIFF transport and dispersion model and forecasted the weather conditions during the drill. (Dennis Finn, 208-526-0566, and Kirk Clawson)

### ***Mesoscale Forecast Modeling***

The 4 km WRF model forecasts for Southeast Idaho have been running steadily every three hours during the last month. Graphical output from the simulations is now available through the FRD web site. At first, the WRF model runs were taking more time to complete than was desired, particularly in comparison to the MM5 simulations that are still running at FRD. Some attempts were made to improve the model performance by adjusting compiler options, but these did not lead to significant reductions in runtime. However, significant decreases in runtime were obtained by adjusting some of the parameters in the WRF input files. (Richard Eckman, 208-526-2740)

### ***Transport and Dispersion Modeling***

Now that the WRF mesoscale model is up and running at FRD, the focus is shifting to upgrading FRD's dispersion modeling capability by switching to the NOAA HYSPLIT model. The general intention is to use output from WRF to drive dispersion forecasts using HYSPLIT. One issue that must be addressed is how best to incorporate wind observations from the INL Mesonet into the HYSPLIT wind fields. Normally, HYSPLIT is driven solely by the 3D wind field obtained from a model such as MM5 or WRF. But experience has shown that it is not uncommon to have periods in which the model winds show major discrepancies with the observed Mesonet winds. We cannot simply ignore these discrepancies and continue generating HYSPLIT output based solely on the model winds. One option is to treat the model winds as a background field and then assimilate the observations in a dynamically consistent manner (e.g., WRF-Var). Another is to derive an alternate 3D wind field directly from the Mesonet observations using a simpler set of dynamic constraints, such as mass consistency. We are working to determine the best way forward. (Richard Eckman, 526-2740)



## Other Activities

### *Papers*

Doran, J.C., K.J. Allwine, J.E. Flaherty, **K.L. Clawson**, and **R.G. Carter**, 2007: Characteristics of Puff Dispersion in an Urban Environment, *Atmospheric Environment*. Volume 41, Issue 16, pp. 3440-3452.

Edson, J., **T. Crawford**, **J. Crescenti**, T. Farrar, N. Frew, G. Gerbi, C. Helmis, T. Hristov, D. Khelif, A. Jessup, H. Jonsson, M. Li, L. Mahrt, W. McGillis, A. Plueddemann, L. Shen, E. Skyllingstad, T. Stanton, P. Sullivan, J. Sun, J. Trowbridge, D. Vickers, S. Wang, Q. Wang, R. Weller, J. Wilkin, A.J. Williams III, D.K.P. Yue, and C. Zappa, 2007: The Coupled Boundary Layers and Air-Sea Transfer Experiment In Low Winds. *Bulletin American Meteorology Society*. Volume 88, Number 3, pp. 341-356

P.G. Black, E.A. D'Asaro, W.M. Drennan, **J.R. French**, P.P. Niiler, T.B. Sanford, E.J. Terrill, E.J. Walsh, and J.A. Shang, 2007: Air-Sea Exchange In Hurricanes. *Bulletin American Meteorology Society*. Volume 88, Number 3, pp. 357-374

**Eckman, R.M.**, R.J. Dobosy, D.L. Auble, **T.W. Strong**, **T.L. Crawford**, 2007: A pressure-sphere anemometer for measuring turbulence and fluxes in hurricanes, *Journal of Atmospheric and Oceanic Technology*. (In press)

**Carter, R.G.**, **N.F. Hukari**, and **J.D. Rich**, 2007: Identifying Natural Clusters in Eastern Idaho Wind Fields: A Practical Application of Cluster Analysis to Wind Forecasting. *Weather and Forecasting*. (Submitted)

Allwine, J., J. Heiser, J. Flaherty, T. Watson, **K. Clawson**, P. Kalb, K. Clark, 2007: Urban Dispersion Program and Opportunities for Emergency Preparedness, *2<sup>nd</sup> Annual NYC Interagency Workshop "Using Environmental Data during Emergencies: From Field Data Collection to Risk Communication"*, New York, NY. (Submitted)

### *Idaho Academy of Science*

Several FRD staff members attended the 49<sup>th</sup> Annual Meeting and Symposium of the Idaho Academy of Science held in Idaho Falls, ID, on 19-21 April. Two oral presentations and 1 poster from FRD scientists were presented at the meeting, as follows:

**Clawson, K.L.**, **N.F. Hukari**, **R.G. Carter**, and **J.D. Rich**, 2007: Climate Analysis of SE Idaho Using the NOAA/INL Mesonet.

**Finn, D.D.**, **R.G. Carter**, **J.D. Rich**, and **K.L. Clawson**, 2007: Atmospheric Flow Decoupling in an Urban Environment.

**Rich, J.D.**, **D.D. Finn**, **R.G. Carter**, and **K.L. Clawson**, 2007: Upwind Dispersion in a Complex Urban Environment.

## ***Safety***

All employees completed the on-line CPR training course.

“Safe Travel” video was viewed at the monthly staff meeting. Great reminder for everyone when beginning summer travel to be cautious, aware and practice safe travel tips.

Donna Harris, Safety Officer introduced herself to Rhonda Carpenter, Headquarter’s Safety Representative to begin coordination and implementing of the office safety program.